

Remark

Applicants respectfully request reconsideration of this application as amended.

Claims 1, 2, 7, 10, 14, 15 and 19-36 have been amended. No claims have been cancelled.

Therefore, claims 1-36 are present for examination.

Claim Objections

Claims 15 and 28 are objected to for lack of antecedent basis. “The” has been added to the claims as suggested by the Examiner.

35 U.S.C. § 112 Rejection

Claims 1, 7, 10, 14, 15, 20-31 and 35 are rejected under 35 U.S.C. §112, second paragraph, as indefinite. “Multiple Loop” has been added to the claims as suggested by the Examiner.

35 U.S.C. § 102 Rejection

Tsatsanis

Claims 1-7, 10-17, 20-26 and 35-36 are rejected under 35 U.S.C. §102(e) as being anticipated by Tsatsanis et al., U.S. Patent No. 2006/0056522 (“Tsatsanis”).

Figure 4 of the present application shows a multiple loop segment 405. This is a standard telephone cable that has four twisted pairs 412, or eight wires 410 total. One pair is required for each analog voice telephone line and so DSL has traditionally been implemented using one pair 412 for each DSL signal. In the language of Claim 1, K=4. Each pair is called a loop because there is one line of the pair that runs out to your

telephone and the other line of the loop that runs back to the Central Office. Two lines, one pair, makes a loop.

In the preferred embodiment shown in Figure 4, one wire 410-0 is selected as the reference wire. This allows wires that were previously used as reference wires to be exploited to carry signals. Looking at Figure 4, instead of using a pair 412 for each signal, seven of the wires 416 share one common reference wire 410-0. One pair for each signal gives 4 signals. One common reference wire gives 7 DSL signals: $2K-1$ becomes $2(4)-1=7$. This provides a significant benefit even if only two pairs are used. Instead of 2 channels, 3 can be provided. If three pairs are used, then there can be 5 channels instead of 3. For a cable with 32 pairs or loops, the benefits are significant. With two pairs, there is 50% improvement. The improvement then asymptotically approaches doubling as the number of loops increases.

Tsatsanis, by contrast, sticks to the older approach of using one twisted pair for each DSL signal. Paragraph 50, line 15, for example, refers to “pairs are conveying information.”

Claim 1, for example, refers to, “the remaining $(2K-1)$ wires being referenced to the reference wire.” In Tsatsanis each wire has its own reference wire.

Claims 14 and 21, for example, refers to “using a third wire.. as a common reference wire. In Tsatsanis, there is no reference wire that is common. Each pair has its own reference wire. Claim 26 has a similar limitation.

Accordingly, the rejection is believed to be traversed.

35 U.S.C. § 103 Rejection

Tsatsanis and Kerpez

Claims 8-9, 18-19 and 32-34 are rejected under 35 U.S.C. §103(a) as being unpatentable over (“Tsatsanis”) in view of Kerpez, U.S. Patent No. 7,106,833 (“Kerpez”). Kerpez was not cited for and neither teaches nor suggests a common reference wire. Accordingly, this rejection is also believed to be traversed.

Conclusion

Applicants respectfully submit that the rejections have been overcome by the amendment and remark, and that the claims as amended are now in condition for allowance. Accordingly, Applicants respectfully request the rejections be withdrawn and the claims as amended be allowed.

Invitation for a Telephone Interview

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.

Request for an Extension of Time

Applicants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,
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